



CASE REPORT

Isolated shear fracture of humeral trochlea

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Introduction

Isolated fractures of the trochlea of humerus are rare. Only three cases have been reported in the literature so far.^{3,8,10} The authors describe a case where an isolated shear fracture of trochlea was recognised and internally fixed to restore elbow function.

Case report

A 30-year-old male was involved in a vehicular accident while driving a scooter and landed on his outstretched hand with the elbow in extension. He presented to the casualty department with a swollen elbow held in some degree of flexion. Examination revealed tenderness on the medial aspect of the elbow. Movements at the elbow joint were painfully restricted. There was no associated neurovascular deficit. Evaluation of radiographs revealed a half moon shaped fragment lying proximal and anterior to the distal humerus simulating a capitellar fracture in the lateral view. But on anteroposterior view, the fracture appeared to involve the trochlea (Fig. 1). The patient was planned for open reduction and internal fixation of the fracture. The joint was opened via a medial

approach. The common flexors were detached from the medial epicondyle and the capsule was incised. The osteochondral fragment was involving the trochlea, with the fracture line extending in the coronal plane across the medial trochlear ridge into the trochlear notch. The fragment was displaced proximally and rotated internally. The fracture was reduced and fixed with two 4.0 mm partially threaded cancellous screws passed from the non-articular area. The elbow was immobilised in a POP back splint and early active range of motion exercises were encouraged at 5 days when the patient was pain free. A removable splint was worn for the first 6 weeks during which period the patient was instructed to carry out the exercises on his own. Muscle strengthening and further rehabilitation was initiated after 6 weeks once signs of



Figure 1 AP and lateral views of elbow showing trochlear fracture.

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Figure 2 One year follow up X-rays of the same patient after internal fixation.

fracture union were evident on radiology. The patient was followed up till 1 year. At the last follow up, the patient was pain free, having returned to his pre-injury occupation with full elbow movements and no evidence of elbow instability. The functional result was excellent according to functional rating scale of Broberg and Morrey.¹

The latest radiographic evaluation at 1 year revealed no evidence of osteonecrosis or degenerative osteoarthritis (Fig. 2).

Discussion

The most common pattern of osteochondral fracture of the distal part of humerus involves the capitellum, similar injuries to the trochlea being extremely rare. Situated deep in the elbow joint, the trochlea is inaccessible to direct trauma.² Forces transmitted from the ulna across the trochlea tend to produce more of a wedging action than a shearing force.^{2,9} Shearing forces that may produce a trochlear fracture can be generated during an elbow dislocation.^{2,4}

Worrel¹⁰ attributed the cause of an isolated trochlear fracture to a force transmitted from the palm of the hand through the ulna to the trochlea following a fall on the outstretched hand with the elbow extended.

We agree with this suggested mechanism of injury, the coronoid process shearing off the antero-inferior portion of the trochlea with the elbow in hyperextension at the time of impact.

Osteochondral fractures of the distal humerus are difficult to assess accurately on standard radiographs. In our case, careful inspection of the

antero-posterior radiograph revealed a fracture of the trochlear region with the fracture line extending into the trochlear notch. A half moon shape fragment can be seen on the lateral view lying displaced anteriorly and proximally. It can be distinguished from the more common type I capitellar fracture involving the adjacent part of the trochlea by the double arc sign.⁷

We reviewed the literature and found two modified lateral views have been described for better assessment of complex elbow injuries. A “radial head capitellar” view might be required to exclude injuries to the coronoid and type II fractures of the capitellum.⁵ A “coronoid trochlear” view delineates the trochlea and coronoid free of overlap of other bones.⁶ When in doubt a CT scan is helpful for delineating the extent and type of fracture more accurately.

The operative treatment of these fractures is equally difficult because of the limited availability of subchondral bone for stable internal fixation.⁷ Failure to anatomically reduce this fracture may not only affect the arc of motion but also jeopardise the elbow stability.⁷ Early recognition, accurate reduction, stable fixation and early motion reliably restored elbow function in this patient.

References

1. Broberg MA, Morrey BF. Results of delayed excision of radial head after fracture. *J Bone Joint Surg* 1996;68(A):669–74.
2. Bryan RS. Fractures about the elbow in adults. *Instr Course Lect* 1981;30:200–23.
3. Foulk DA, Robertson PA, Timmerman LA. Fracture of trochlea. *J Orthop Trauma* 1995;9(6):530–2.
4. Grant IR, Miller JH. Osteochondral fracture of the trochlea associated with fracture dislocation of the elbow. *Injury* 1975;6(3):257–60.
5. Greenspan A, Norman A, Rosen H. Radial head-capitellum view in elbow trauma: clinical application and radiographic-anatomic correlation. *Am J Roentgenol* 1984;143(2):355–9.
6. Guilbeau JC, Monelhi MM, Nahum H. Modified profiles of the elbow in traumatology: the value of radial head-capitellum view and a new coronoid-trochlea view. *J Radiol* 1986;65(5):439–44 (Article in French).
7. McKee MD, Jupiter JB, Bamberger HB. Coronal shear fractures of the distal end of the humerus. *J Bone Joint Surg* 1996;78(A):49–54.
8. Oberstein A, Kreitner KF, Lowe A, Michiels I. Isolated fracture of trochlea humeri following direct elbow trauma. *Aktuelle Radiol* 1994;4(5):271–3 (Article in German).
9. Smith FM. *Surgery of the elbow*, second ed. Philadelphia: W.B. Saunders; 1972.
10. Worrel RV. Isolated displaced fracture of the trochlea. *NY State J Med* 1971;71(19):2314–5.